

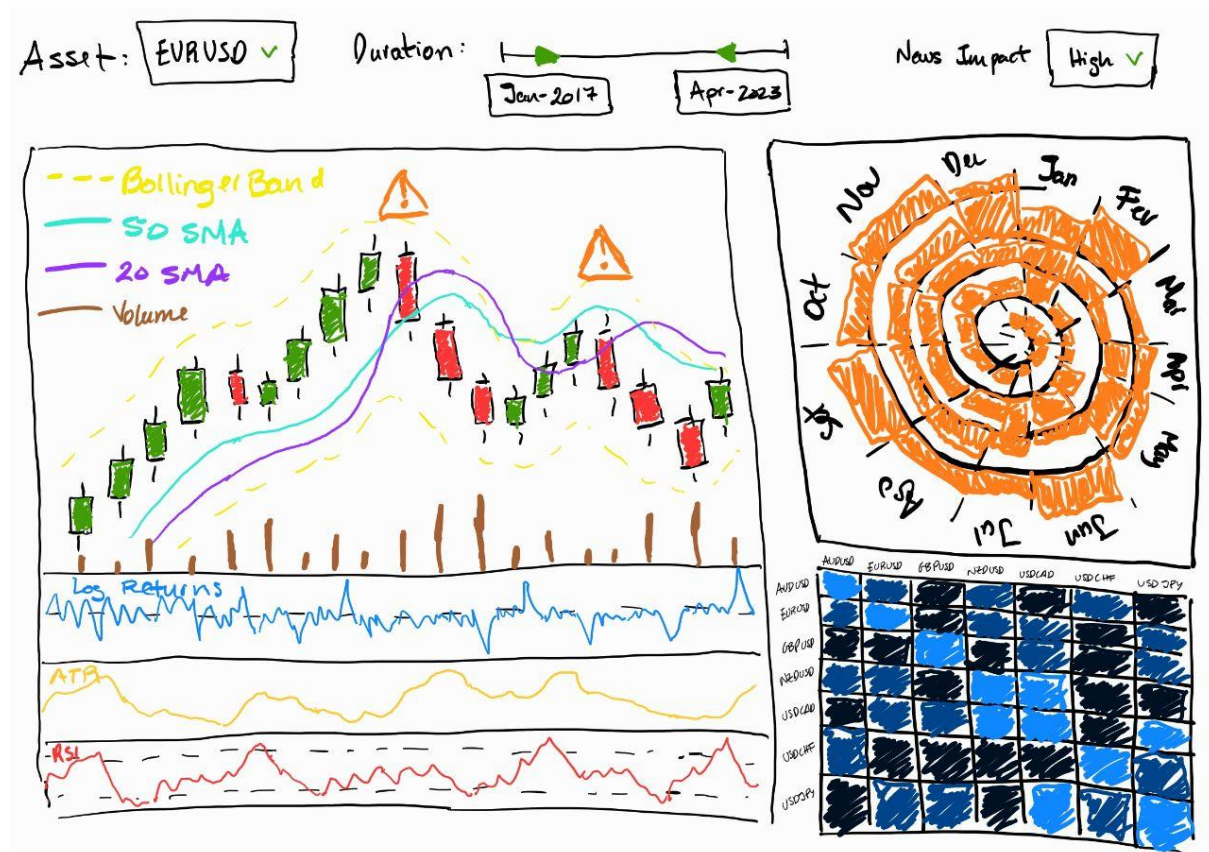
## Checkpoint III: Visualization Sketch

Group: G13

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### Overview

Our dashboard will consist of three idioms, one candlestick bar chart, one spiral plot and one heatmap. In the upper part of the dashboard there will be a drop-down menu to select the asset, a drop-down menu to select the news impact and a slide menu to select the duration of the analysis. In the next sections, we will explain further aspects regarding the attributes encoding and how the idioms answer the proposed questions interactively.



### Visual Encoding

**Candle bar charts** in finance represent price movements over time. Each bar encodes four key data points: the opening price, closing price, highest price (high), and lowest price (low) during a specific time period. The body of the candlestick represents the opening and closing prices, with color often indicating whether the price went up or down during that period, while the "wick" or "shadow" extends from the high to low price.

**Spiral chart** is a unique visualization that combines time and cyclical data. It consists of a spiral divided into 12 arcs, one for each month, and the circle expands or adds another round as the year progresses. We used a range of colors to represent the volume of news in that month and year. This format allows you to display cyclic patterns or trends across months or years in a visually engaging way.

**Currency based heatmap** is a correlation matrix for currency pairs. It displays the correlation between various currency trade pairs (e.g., USD/EUR, GBP/JPY) using a range of colors to encode the correlation. Warmer colors indicate stronger positive correlations, while cooler colors represent weaker or negative correlations, helping to identify currency relationships and trends over time.

**Three Line charts** that share a common X-axis, which represents a shared time scale. They are organized in rows, each chart plotting a distinct attribute of the dataset (Log Returns; ATM and RSI). Each line chart uses a single color to represent the data series, making it easy to distinguish between them.

## Answering the Questions

### (1) What is the pattern of OHLC prices over time?

**Candlestick:** Choice for visualizing OHLC (Open, High, Low, Close) price data over time. Each candlestick or bar represents a specific time period (e.g., one hour, one day) and provides information about the opening, closing, highest, and lowest prices during that period. Patterns such as trends, reversals, and volatility can be identified by analyzing these charts over time.

**Temporal Series Chart:** A temporal series chart is a basic line chart that displays price data over time as a continuous line. This chart can help identify trends and patterns in the OHLC prices by showing how they change over time.

### (2) What influence does the release of fundamental news have upon each forex pair?

**Candlestick:** Candlestick or bar charts can be used to correlate the timing of fundamental news releases with price movements. For example, significant price spikes or drops following a news event can be observed on these charts, helping to gauge the impact of news on forex pairs.

### (3) Which countries had more relevant news?

**Spiral Chart:** A spiral chart is less commonly used for financial data analysis but can be adapted to visualize news relevance. Each revolution of the spiral can represent a specific time period, and the distance from the center can represent the relevance or impact of news events. Countries with more relevant news would be represented by longer or more pronounced spirals.

### (4) How effective are the technical indicators in predicting future price movements?

**Candlestick:** By overlaying technical indicators on a candlestick or bar chart, traders can assess their effectiveness in generating buy/sell signals or identifying potential reversals.

**Temporal Series Chart:** Technical indicators can be applied to temporal series charts as well. This allows traders to analyze how indicator signals align with historical price movements and assess their predictive power.

### (5) How do different currency pairs interact with each other in terms of price movements?

**Heatmap:** It is easily possible to identify patterns of interaction between different currency pairs.

Strong positive correlations suggest that these pairs tend to move together. When one pair goes up, the other tends to go up as well, which might indicate pairs suitable for hedging or pairs that can be traded together to reduce risk.

Strong negative correlations indicate pairs that tend to move in opposite directions. When one pair goes up, the other tends to go down, which might suggest pairs for pairs trading strategies where one is bought while the other is sold.

Neutral or low-correlation cells suggest that there is little to no relationship between the price movements of those pairs, which might imply diversification opportunities, as these pairs move independently.

Now we present a workflow procedure via a storyboard. The workflow starts by selecting the asset that wants to analyse, as we can see in the top-left image. Then, the user should select the duration of the analysis, as we can see in the top-right image. Following this, the user selects the news impact category. Finally, the data should respond accordingly to the filters and the user may hover the mouse over the idioms to check for details, for example, when hovering over a news alert signal (represented by the “alert” symbol in orange in the candlestick bar chart) this mark should turn red, a red vertical line should appear on the chart, the respective column of the spiral plot should also turn red and a pop-up menu should appear with the further information.

